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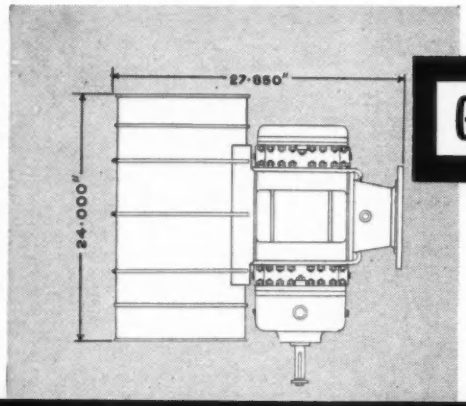

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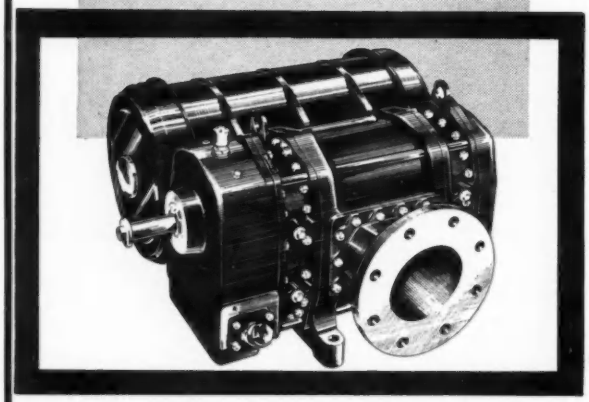

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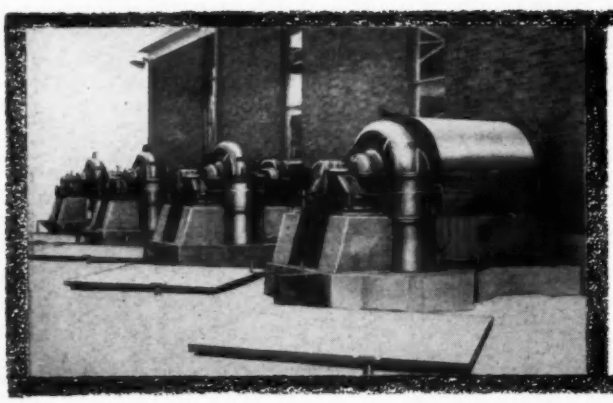

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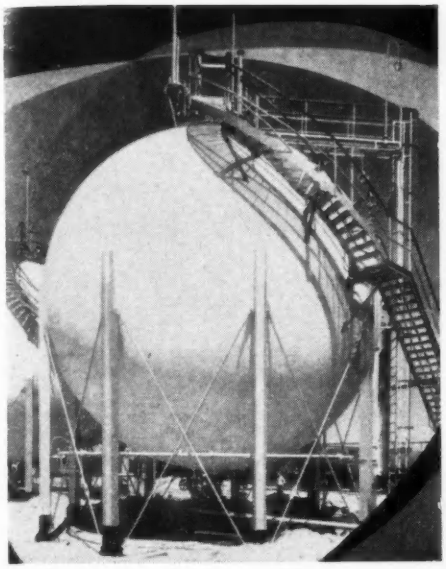

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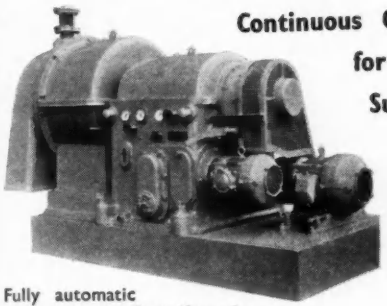

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Gas Journal

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WEDNESDAY, JUNE 8, 1960

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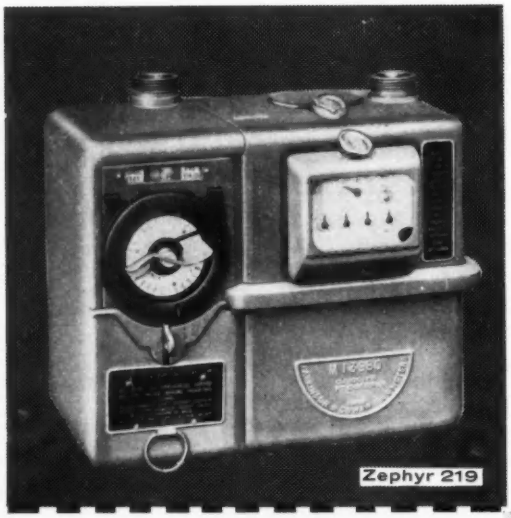

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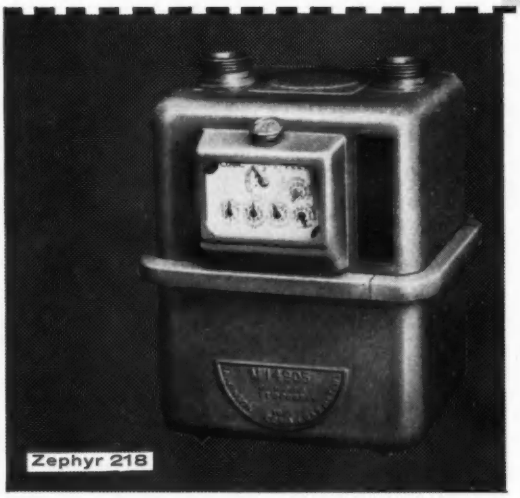

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Gas Journal

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Background for top management

THE responsibility of a President of the Institution of Gas Engineers faced with the task of writing his Presidential Address is considerable. As a man honoured by his colleagues and placed by them in the position of spokesman for his profession, the President is expected not only to provide the Institution with words of wisdom calculated to guide and inspire its members, but also to some extent to reveal the industry's fortunes and aspirations to a much wider audience. For although the President's formal terms of reference may be limited to his duties in relation to the actual members of the body he represents, the fact is that some point in his address is often seized on by the national Press, thereby achieving publicity of a type far removed from the confines of his own Institution.

In Mr. Duncan D. Melvin the Institution has a President who clearly places his responsibilities to the Institution first, for the address which he presented at the Annual General Meeting on May 31, and which we reproduce on a later page, reflects the views of an eminent engineer of the old school—and we intend that phrase as a compliment—who from the standpoint of a traditionalist can yet bring to his survey of the industry and its place in the fuel scene genuine imagination and freshness of thought.

His address has something of the flavour of a well-cooked Christmas pudding in that a variety of excellent ingredients—laced, no doubt, with Mr. Melvin's national nectar—are combined to produce an unusually mellow and satisfying whole. There is indeed a little of everything—a report of work and visits undertaken, a review of the Institution's progress, a historical flashback to the beginning of the century (including an account of the Granton works), an estimate of the future trend of fuel usage, a description of the energy pattern in Europe, a realistic assessment of nuclear energy, and a concise review of the gas industry's case for its survival and future prosperity.

All this is excellent, but the best is yet to come. In the closing paragraph of his remarks on the last subject mentioned above, Mr. Melvin points out that to achieve the transformation he has envisaged will call for men of ingenuity and resource, and that it is the Institution's responsibility to consider how young engineers are being equipped for 'the years of challenge.' Such enterprises, he suggests, will make demands beyond mere competence in the traditional technology of the gas industry. And thus he provides the peg on which to hang what we regard as the most important part of his address—and, we suspect, the section which gave him the most pleasure to write.

In essence this is a criticism of the conditions which prevent engineers and technologists from playing a wider rôle in top management. He points out that lack of opportunity for fuller development may be inherent in the functional organisation now being generally adopted by the area boards and from the considerable specialisation now occurring within gas engineering itself. 'While there is need in the technologist for an exact man, the wider problems of direction and co-ordination of human activity call for a greater diversity of qualities.' He goes on to warn against too early specialisation in formative years which create a real danger of breeding a race of specialists who more and more will only be able to communicate with specialists in their own field, and be unable to adapt themselves to administrative matters. Though specialists have a great part to play in a team, absence of team control and direction can only lead to inefficiency in industrial organisation. 'In the ultimate', says Mr. Melvin, 'the spirit of an organisation matters more than the pattern.'

If the gas industry requires an example of what can happen when specialisation runs amok, may we suggest a close look at the medical profession where over-specialisation has resulted in an astonishing lack of co-ordination and direction. It would be a sad thing indeed if the gas industry were to become equally unbalanced. Fortunately there is still in the industry a high percentage of men trained to be 'engineers and managers'; it is up to them to see that the very real importance attached to breeding specialists does not blind the industry to the need, no less great, for experienced and efficient managers. In drawing attention to this important

requirement Mr. Melvin deserves the industry's best thanks.

However, one may reasonably ask, where does the Institution, as the leading professional body of the gas industry, go from here? If the conception of management outlined in Mr. Melvin's address is generally thought to be desirable, then its influence should be felt in I.G.E. programmes. 'A knowledge solely of processes and techniques domestic to the gas industry is not a sufficient background. The effective manager must be equally well informed of the strengths and weaknesses, and of the policies, of other fuel industries before he can plan and organise to best advantage. He must be aware of the significance of the activities for which he is responsible in the social and industrial community at large.' Those words of the President could, we suggest, be interpreted as a guide to the planning of future I.G.E. programmes. A certain amount has already been achieved; there have been papers on nuclear energy, market research, and a number of aspects of commercial sales practice which were calculated to help the gas engineer to see himself in the context of the fuel industries today. But a good deal more might be done. We have already learnt a good deal about the techniques of work study from such private enterprise colossi as I.C.I. Could we not learn more, about such matters as management, personnel handling, etc? Could not authors include executives of the coal, oil and electricity industries? In our view, by an extensive and imaginative widening of its programme, the Institution could do a great deal to prevent the gas industry becoming the race of specialists Mr. Melvin so rightly fears.

A most stupendous effort needed

THE first impression of anyone reading the Annual Report and Accounts of the National Coal Board for the year 1959 might be one of despair. Can a nationalised industry working under such adverse circumstances ever hope to make a surplus? Must it continue to make these heavy deficits? In 1958 the deficit was £3.5 mill. and in 1959 some £24 mill, the highest since vesting date.

In spite of these deficits, the N.C.B. does in fact continue to make an operating profit. In 1958, this amounted to some £18½ mill., over 50% of which was from open cast working, and in 1959 nearly £13 mill. of which nearly 40% was contributed from open cast coal sales.

The development work which has been going on throughout the coalfields since vesting day has been on a vast scale and the total money borrowed for this development by the Board now amounts to £877 mill. In the same period it has had to bear capital charges of £258 mill., including £54 mill. for the repayment of the principal. In the year under review, the charges paid to the Ministry of Power in this connection amounted to no less than £34.5 mill., of which £14.4 mill. was repayment of principal.

The payment of these very heavy charges, though to be expected in any business transaction, are inclined to arouse doubts as to whether even in the long term the mining industry can ever hope to pay its way. This does not in any way imply that because of this, coal should not be mined in this country and that the whole industry should be allowed to run down slowly and other sources of fuel be developed. Coal is our particular indigenous fossil fuel and it is common knowledge that in all probability long after sources of oil and natural gas have been exhausted, coal will be available as our most important source of energy.

A big responsibility, therefore, must be carried by the Board to keep the coal industry running, efficiently at least technically, so that when the major development work is completed, it will be able to meet the future demands that will certainly be made on it.

The most important task facing the Board in 1959 was to reduce output and this included closing collieries which were either worked out or ceased to be profitable. Its chief objective was to reduce output without undue harm to future productive capacity, at the same time avoiding a crippling loss of revenue, and without severe hardship to the mining community.

In 1959, 53 collieries were closed but of the men displaced only 1,300 were left without alternative jobs at the end of the year. To lessen the effect on deep-mined coal production, open cast production was cut back from 14.3 mill. tons to 10.8 mill. tons, in spite of the severe loss of profit involved.

The stocking of coal continued on a big scale and undistributed stocks over the year rose to 36 mill. tons; the costs incurred in the whole operation, including lifting and preparation for sales, amounted to £27 mill.

This seems a large sum to pay for the continuous production of coal and the Board have been criticised for not selling off these stocks at reduced prices. In its opinion there could have been no possible advantage gained from such a course, since sales at bargain prices were unlikely to be great enough to reduce stocks materially and if they had, the effect on production might have been disturbing.

For 1960, planned production is again to be reduced to avoid any further increase in stocks and will amount to 195 mill. tons, including 7 mill. tons of opencast coal. Demand is estimated at 196 mill. tons. Such efforts to reduce production may well raise production costs, but the Board hope to counteract this tendency by a further rise in productivity.

We have so far dealt with the somewhat negative side of the Board's activities, its efforts to reduce the available coal to the needs of a shrinking market, which it hopes has found equilibrium at a lower level. But what are its achievements in the more positive field of increasing sales and making out a better case for the use of coal? Can the Board overcome the resistance to the buying of coal which so suddenly has become apparent.

The report points out that adverse comparisons are made between old, out-of-date coal burning equipment

and the most modern oil burning plant. This we feel is a legitimate complaint, but have the Board in the past been quick enough to realise this before it was too late and rival fuels had stepped in? The most up-to-date coal burning appliances, the Board claims, are able to burn coal smokelessly. With the low price of solid fuel per useful therm, such a claim pushed ruthlessly by experts might well assist in stopping the flight from coal provided labour costs are no higher than with other fuels. The development of smokeless fuel production is most encouraging—the Phurnacite plant has been enlarged four times altogether—and the proposed plants for new types of fuel in the South Western and West Midlands Divisions are signs of real progress in this direction.

Perhaps the most striking achievement during the year is the rise in the productivity of the face worker to 1.332 tons per shift— an increase of 5.3% over 1958—which has made possible a reduction of 1s. 6d. a ton in average costs over the year. This we feel is a fair indication of the number of modern collieries coming into production, and will clearly have been influenced by the closing of high cost pits. Such an achievement augers well for the future and should greatly assist in keeping prices steady, as total output falls.

Of the Board's ancillary interests, the coking and by-product sections are of most interest to the gas industry, so it was with some dismay that we realised that the demand for metallurgical coke had not risen as expected over the year. Some coke oven plants have been closed and others run above their saleable output to maintain gas supplies to the gas boards. In this connection we were most interested to see that a Ruhrgas slagging gasifier was to be installed at Manvers Main to supply producer gas from small coal for underfiring. This should improve flexibility of gas supply and help to reduce the cost of gas production.

There is no doubt that the Board is fully alive to the situation facing it, but a stupendous effort is needed to effectively surmount its present problems.

Commentary on the News

S.E.G.B. dealers' conference

THERE seems to be general agreement that the gas industry is unlikely to achieve the massive appliance sales it requires without the assistance of a network of authorised dealers; and as boards' efforts in recent years have shown, the right degree of co-operation is not easily achieved. It has become abundantly clear that good results cannot be achieved unless the gas boards successfully sell their story to the dealers and so convince them that gas offers a field for mutual benefit. That is the background to the South Eastern Gas Board's first authorised dealers' conference, which was designed very much along the lines of similar gatherings held in the North Thames area. The success of this technique is undeniable and we have no doubt that the South Eastern Board will find it of great benefit in furthering its sales activities.

After a welcome to the delegates from Mr. V. W. Stanton, Commercial Manager and Board Member, Mr. J. D. C. Woodall, Sales Manager, spoke on 'Present Sales and Future Prospects,' in which he emphasised the importance of room heater sales; in fact of the total sales of some 41,000 space heaters during the last financial year, only 1,500 were by dealers.

Following an explanation by Mr. A. E. Tullberg, the Board's Publicity and Information Officer, of the part that publicity was playing in promoting sales, there was a particularly interesting contribution by Mr. T. Whimster, a former Parkinson representative who now runs a successful business as an authorised dealer. He explained how he had chosen a shop in a large covered market in a working-class district, how he placed appliances on show outside the showroom, and how he was prepared to use such publicity media as sandwich-board men, especially at weekends. He was critical of the Board's refusal to allow dealers to use their own canvassers, and of high fixing costs.

Other speakers included Mr. A. F. Oatley, Chairman of Cannon (G.A.) Ltd., who spoke on 'The Manufacturer and the Dealers,' and Mrs. Mair Jones, the Board's Chief Home Service Adviser, who introduced a demonstration of automatic cooking by Miss Betty Gibson. Finally, an open forum enabled delegates to raise doubts and queries.

This alliance between gas boards and dealers can do nothing but good, and its benefits are more far-reaching than the sales which are its prime objective. For this is a link between nationalisation and private enterprise with both parties out for the same thing—more appliance sales. Would it be too much to hope that each side can learn something from the other?

Flexibility of mind

THE high standard of the publications issued by Sulzer Bros. Ltd., of Winterthur, Switzerland, must rank in their particular class with the quality of the engineering products turned out by this firm and exported all over the world.

Recently we have received copies of the current number of the Sulzer Technical Review and a special publication to celebrate the 125 years of the firm's existence.

The former, a larger issue than usual, contains a number of the type of informative technical articles which we have grown accustomed to find in it, together with lavish production and excellent illustrations. It contains in addition, however, a description of the new engineering shops including the foundry and machine shop, at the firm's new works at Oberwinterthur.

The latter is a well-illustrated book of over 100 pages which describes the history of the firm and its beginnings in 1834. Such early histories, we find particularly interesting since we are often so forcibly reminded that many famous engineering firms of today were started on remarkably little monetary capital. They relied on the determination and extremely high skill of a handful of men who knew they possessed the ability to manufacture products then in demand. Flexibility of mind, the ability to adjust their methods with changing circumstances and a readiness to exploit new ideas have kept such firms in the forefront of manufacturers of high quality engineering products throughout the world.

Presented at the 97th Annual General Meeting of the Institution of Gas Engineers, Edinburgh, May 31—June 3

The President's Address

By DUNCAN D. MELVIN, M.Inst.Gas E.,

Member, the Scottish Gas Board.

TWELVE months ago, you entrusted me with the Presidency of this Institution, and I would again express my sincere thanks for this honour and privilege.

With the help and understanding I have received from the Council and members and by the kindly receptions I have been accorded wherever it has been my fortune to act as your representative, this distinction has brought me a great wealth of rewarding experience. The concluding days of my presidential year are made the happier that our 97th. Annual General Meeting is being held in this 'City too well-known to admit description', where I have had the privilege of practising the profession of gas engineering for over a quarter of a century.

The Institution was to have met here in 1944, under the Presidency of my former well-loved chief, James Jamieson, but D-day intervened and sterner duties took preference. It is to 1901 we must go for the last meeting of the Institution in Edinburgh, this being the autumn meeting held under the Presidency of Walter Ralph Herring, whose pioneering spirit in planning and technical development did so much to benefit this city and the industry.

The custom of presenting his address towards the conclusion of his year of office gives the President an opportunity of reviewing the work carried out during the year, of highlighting important events and of giving some account of his stewardship.

I was privileged to convey your greetings and good wishes to the French and Swiss Gas Associations, and to present your congratulatory Address to the German Gas and Water Association on the occasion of its centenary meeting in Frankfurt. These greetings were warmly reciprocated.

In all these and other visits by your officers, we were most warmly welcomed and we returned much impressed by the progress being made by the gas industry in Europe. Continental gas engineers were loud in their praise for the work done by their British colleagues in overcoming the many technical and design problems involved in the early voyages of the Methane Pioneer and the subsequent transmission, storage and processing of the liquefied methane.

Diffusion of knowledge

During the year, I attended meetings of district sections, affiliated associations and junior gas associations, and I have been greatly impressed by the enthusiasm of the members and by the work being carried on. Opportunities are provided by these meetings for the promotion and diffusion of new knowledge and fresh thought, which, in these days of fundamental change in the technology and administration of the industry, is so essential.

With each year, the Institution increases in size and in status. The membership doubled between 1920 and 1940, and has almost exactly doubled again from 1940 to 1959, most encouraging and gratifying evidence of the Institution's enhanced status and significance.

The numbers in the class of members are increasing slowly while the associate membership class has almost trebled since 1939—which may be a natural outcome of the education scheme. Both classes comprise corporate membership, but the aim should be to transfer to the senior class when so qualified. This seems a natural procedure to follow and one that those who drafted the By-Laws contemplated and provided for in the constitution.

Consequent on the resolutions passed at the special session last year, a petition was presented, to the Queen's Most Excellent Majesty in Council, for the amendment of the Royal Charter and the By-Laws, and the Supplemental Charter and revisions have now been approved.

The most important alterations were to the By-Laws governing the qualifications for membership and associate membership and the inclusion of a class of graduate member. These arose from the revision of the associate membership examination.

Education scheme developments

Since its inception in 1923 the education scheme has been under continuous review so that it is at least abreast, but preferably somewhat ahead, of the industry's requirements of trained technologists. The new regulations and syllabuses have been determined by the Council on the recommendation of the education committee after lengthy consideration and discussion and after ascertainment of the views of area gas boards, district gas education committees and technical colleges. Their purpose is to cater for the fields of production, distribution and utilisation.

The regulations and qualifications for corporate membership also enable the Institution to include specialists in their own fields who may be required for the new gas industry.

The industry is entering a period of change and, while traditional techniques of operation will continue for a long time, new methods of gas making, involving other branches of chemical engineering, novel methods of distribution and storage, and extended applications in the domestic, commercial and industrial fields will call for people whose training is such that transfers between functions are possible. The scale of operations in all fields will increase substantially.

In March, we were greatly honoured by the visit to the Institution Headquarters of Her Majesty's Minister of Power, The Right Honourable Richard Wood. The relations between gas engineers and the Ministry of Power officers have always been most cordial, and this visit was an indication of continued interest in the Institution and its

THE PRESIDENT DELIVERING HIS ADDRESS AT EDINBURGH LAST WEEK.

work. The Minister, in reply to my assurance of our whole-hearted support in the interests of the gas industry and of our help in making the best use of the available fuel resources, said in the course of his remarks:

'. . . I should merely like to put on record what I have heard about the work of the Institution in the past, and the immense contribution it has made to the success of the industry. I have realised, as I have travelled about this island in the last few months, the way in which problems vary from one part of the country to the other. . . . It must be of immense value to the industry to have an Institution of this kind, which can pool knowledge and offer to all in the industry a point of view based on the sum of experience throughout the island.

'I think the need for the Institution will be just as great in the future. The two great needs in the future are going to be to attract the right kind of people to the industry and to keep pace with technical changes and conditions that will become more and more competitive. . . . In the past, there has been close co-operation between the Ministry and the Institution. I hope that it will continue and prove of some value to you. It certainly will be of immense value to us'.

The start of a decade seems a suitable time to pause for a little to review the past, observe the present and ponder what the 1960's may hold for the industry and for the Institution.

On perusing the Presidential Address and proceedings of 1901, the advent of electricity as an alternative lighting medium on a commercial basis was not uppermost in the thoughts of engineers and administrators. More concern was being shown in developing means of reducing manufacturing costs and in implementing the idea of service to the consumer, while the first warnings of the need to attract new loads were being heard.

Difficult to recruit

Technical education, said the statesmen of the day, was the only means whereby the industrial supremacy of Great Britain could be maintained. Mr. Herring discoursed on the difficulty of recruitment of people of the right type and put forward a rather formidable system of education and training.

A chapter in the history of the gas industry was closing. The need for gas rich in illuminants had ceased to exist, and the change from the photometer to the calorimeter for evaluation of gas quality seemed imminent. But the change this might make in methods of gas manufacture was not clear, although it was hazarded that the multiplication of unit methods of retorting, as in the horizontal retort, would be abandoned for one of carbonisation in bulk.

The fulfilment of the forecast that methods of carbonisation would change was evidenced by the greater part of the proceedings of the Annual General Meeting in Glasgow

of 1911 being devoted to the description and operation of vertical retort installations.

During that year, too, the Institution was responsible for the momentous decision to establish the British Commercial Gas Association; the President of the Institution also to be President of the new commercial and sales association.

It was clear that Institution members, as a body, were becoming very much aware that devotion to and concentration on the engineering side of the industry was not enough. It was beginning to be realised that consumer satisfaction and commercial development in its widest sense were essential to an expanding and successful future for the industry.

Start of the 20th century

The start of the 20th century saw the inauguration of the famous Granton works, designed by Walter Herring. These are among the finest in the spacious layout, and the massive buildings, so typical of the period, are probably some of the last examples of their kind.

While during the early years of operation, the capital debt incurred in their construction was a considerable burden on the gas consumer, eventually, just before the second world war, gas was made at 2d. a therm and sold at an average price of 6d. a therm, with a top price to domestic credit consumers of just under 7d. a therm. This was achieved by the prudent writing down of capital, by keeping the plant up-to-date in design, but mainly by the progressive introduction of vertical retorts. Their eminent suitability for the carbonisation of Scottish coals was a major factor in achieving, first, stability and, subsequently, a reduction in gas prices as outputs increased.

The progress of this representative (Scottish) undertaking as measured in terms of gas output is probably typical of the industry. The output chart from 1880 (Fig. 1) reveals the periods of steady progress, the periods of 'marking time', the marked influence of the two world wars and the general raising of living standards.

TABLE 1.—*Output increase in decades.*

Year	Output (mill. cu. ft)	Increase over decade (mill. cu. ft)	Percentage increase over decade
1	2	3	4
1890	1,273		
1900	1,883	610	48
1910	2,102	219	12
1920	2,438	336	16
1930	3,267	829	34
1940	3,928	661	20
1950	6,352	2,424	62
1960	6,696	344	5

Ignoring any effect from the absorption of several small undertakings, the increases in each ten-year period are shown in Table 1.

The upward trend evident in the 1890's did not continue at the same rate into the 20th. century, and it was not until the end of the first world war that substantial progress was made.

Local authority building programmes and the introduction of more intensive selling methods provided the large increases of the inter-war years.

The 1940 to 1950 period is outstanding and was one of the greatest activity. No doubt, much of the sales effort in recent years has been expended in consolidating the loads acquired then or in replacing those loads of a transient nature. Costs and selling prices have moved adversely in relation to competing fuels as a result of the abrupt upward movement in the price of coal commencing in 1945 and continuing at an increasing rate in the past ten years. This is the principal factor that has arrested major progress between 1950 and 1960.

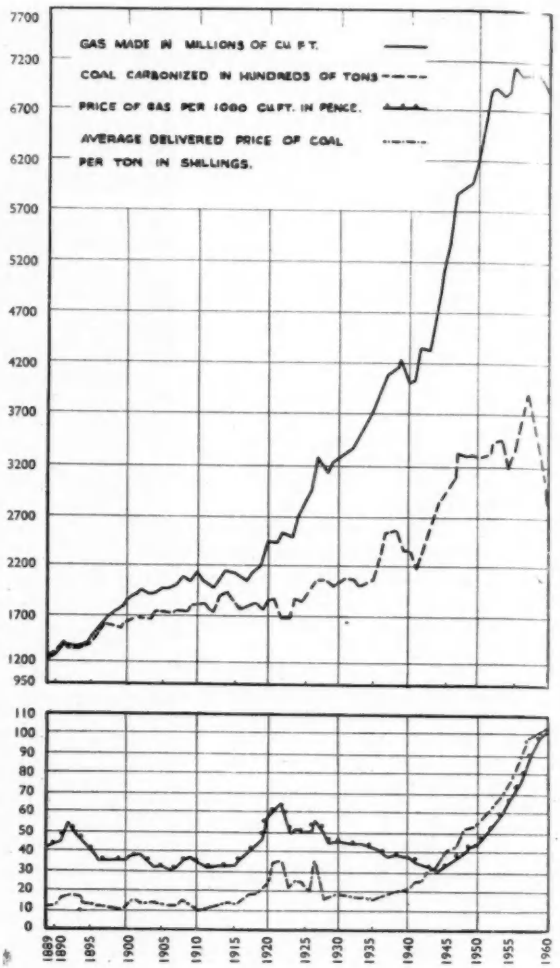

FIG. 1.—*Gas production: Coal usage and cost: average price of gas for Edinburgh from 1889 to 1960.*

Many estimates of the future trend of fuel usage have been made, some of which have inclined to be over generous in the rate of increase, but, if the doubling of the standard of living over the next quarter century is accepted, a major increase of energy supply will be required in industry, commerce and the home. The contribution to the gross energy requirements by the respective fuel industries will depend on availability, utility and relative cost, although indirect influences, including fashion, may play their part.

Trends in fuel consumption have been calculated[1] on the basis of some 70% of the expected rate of increase in national productivity, and have indicated a possible increase to 350 mill. tons of coal equivalent by 1975, which agrees with the forecast of 300 mill. tons of coal equivalent by the middle 1960's indicated by the Government in July, 1959. (Fig. 2.)

This chart indicates the progress, in tons coal equivalent, of oil, nuclear energy and coal by 1975, and the total curve shows how consumption should rise steadily. The disturbing trend is that shown for coal. While, not so long ago, authoritative estimates of availability were as high as 240 mill. tons of coal by 1970, the recent 'Revised Plan for Coal' limits production in 1965 to 206 mill. tons.

The estimated use of coal in its primary and refined

TABLE 2.—*Coal Consumption.*

Consumers	Coal consumption (mill. tons)					
	1947	1956	1957	1958	1959	1965*
1	2	3	4	5	6	7
Power stations	27·1	45·6	46·5	46·2	46·0	55·0
Coke ovens	20·4	30·3	31·7	29·0	26·9	35·0
Gas works	22·7	27·8	26·4	24·8	22·5	21·5
Railways (excluding brickettes)	14·3	12·1	11·4	10·4	9·0	6·0
Sub-total	84·5	115·8	116·0	110·4	104·4	117·5
Industrial (including misc.)	52·7	56·3	53·7	49·2	45·9	43·5
Domestic	31·3	33·0	31·1	31·7	29·4	27·0
Miners and Collieries	16·0	13·3	12·4	11·6	10·4	8·0
Total inland	184·5	218·4	213·2	202·9	190·1	196·0
Exports and bunkers	5·3	9·7	7·9	4·8	4·4	10·0
Grand Total	189·8	228·1	221·1	207·7	194·5	206·0

Estimates shown in Table 1 of the National Coal Board's 'Revised Plan for Coal'

forms leaves the substantial gap of about 100 mill. tons coal equivalent in 1965, or about 155 mill. tons equivalent in 1975. Nuclear energy, oil and liquefied gases are the possible sources for filling this energy gap, but, in view of the constructional delays and mounting capital and running costs of nuclear stations, their contribution may be much less than expected. The alternative to the consequent increase in imports of oil and liquefied gases is the greater use of coal in carbonisation or gasification plants, or by conversion to electrical energy.

The total inland use of coal by the various groups or classes of consumers in recent years, and the anticipated use in 1965, are shown in Table 2.

The decrease in inland demand between 1956 and 1959 is marked and amounts to 28.3 mill. tons. Although electricity output has increased substantially over these years, coal to power stations is constant and reflects the increase in operating efficiency and the greater use of oil. Increased use of coal by the electricity industry is forecast, and this might mean an additional 9 mill. tons per annum by 1965.

Consumption in coke ovens has fallen by 4.8 mill. tons in two years, but is expected to increase, with renewed activity in the steel industry, by 8.1 mill. tons by 1965. Despite the increased requirements of these two major users, of over 17 mill. tons by 1965, much of the increased demand is offset by falls in the estimated demand of other groups, leaving the use of coal in inland markets at 196 mill. tons in 1965, or a net increase of 5.9 mill. tons over 1959.

The use of coal in the gas industry has fallen from 27.8 mill. tons in 1956 to 22.5 mill. tons in 1959, a decrease of 5.3 mill. tons, and, by 1965, is expected to be still lower at 21.5 mill. tons, despite an estimated increase in gas output of 9%.

The closure of the smaller production units and the increased base-loading of the carbonisation process in the larger units has led to further improvement in the already high efficiency of the process and accounts for some of the difference. Part of the decrease in the use of coal is due to the greater intake of gas from coke ovens, but recently the main cause has been the need to seek greater manœuvrability in the use of available raw materials and greater control over the relative production of gas and coke. Oil, light petroleum distillates, liquid gases and refinery gases are all being used in increasing quantities and are making their contribution towards the stabilisation of gas prices.

The European energy pattern has recently been under consideration, and the Energy Advisory Commission of the Council of the Organisation for European Economic Co-operation, under the chairmanship of Professor Sir Austin Robinson, of the University of Cambridge, has issued its first Report.[2]

The trend of estimates of total demand and the pattern of potential supplies in the O.E.E.C. area, as shown in Table 3, are similar to estimates for the United Kingdom.

The European energy requirement is expected to increase by at least 548 mill. tons of coal equivalent in 20 years, an increase of 70%.

In its Report, the Commission discusses the fuel and energy problems of Europe, and its conclusions and recommendations are not inappropriate to circumstances in this country.

The shortage of primary fuels in Europe has given place to keen competition. Since 1913, oil prices have maintained their relationship with general costs, but by 1953 coal had become some 50% more expensive. Coal has, therefore, become less competitive despite increases in the efficiency of utilisation

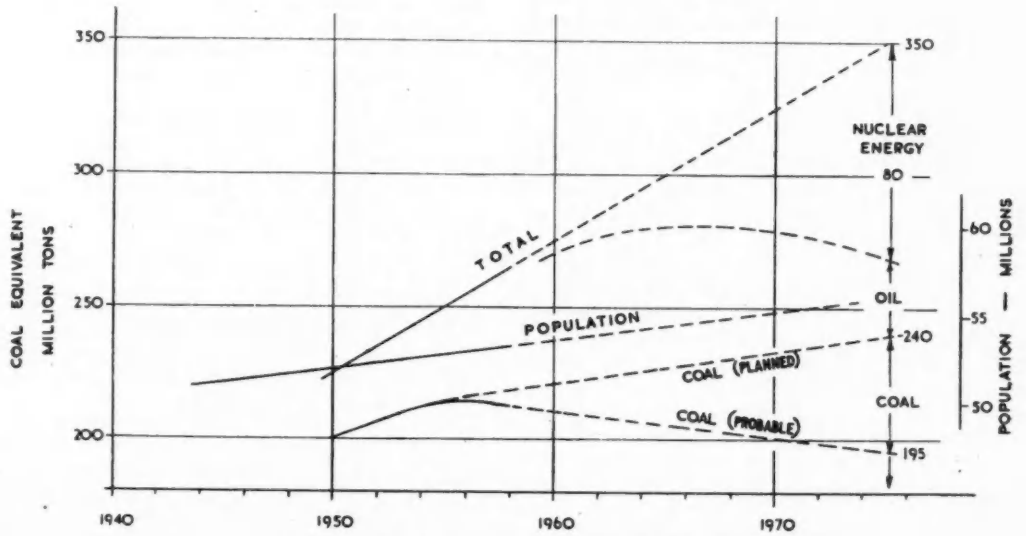

FIG. 2.—*Total energy requirement in Britain.*

TABLE 3.—*Estimates of total demand of potential supplies of primary energy in the O.E.E.C. area.*

	Mill tons of coal equivalent		
	1955	1965	1975
1	2	3	4
Mean estimates of total demand for primary fuel	777	1,010	1,325
Potential indigenous supplies :			
Coal	477	440 to 480	430 to 495
Lignite	30	45	60
Crude oil	13	30	50
Natural gas	7	25	50 to 60
Hydro power	56	95	140
Nuclear energy	—	15 to 20	30 to 90
Other fuels	20	20	20
Mean of estimates	603	690	850
Potential imported supplies :			
Oil	146	260 to 310	380 to 500
Natural gas	—	5	10 to 75
Coal	28	10 to 60	10 to 60
Mean of estimates	174	325	515
Mean of total potential supplies	777	1,015	1,365

The future of coal is seen in a concentration of production in more efficient pits, thus enabling costs to be reduced and a more flexible pricing policy to be adopted.

The increased energy demand, up until 1975, is mainly to be met by increased oil imports and by the development of idigenous and imported supplies of natural gas. Nuclear energy will not make any major contribution by 1975, and its immediate future seems to depend on economic considerations. Most countries are obviously buying experience in this field as a safeguard against the future, and the contribution nuclear energy might make in 15 years' time will not exceed 10% but is more likely to be 5%.

Conclusions of the commission

Several of the conclusions of the Commission seem appropriate to circumstances in the United Kingdom:

Conclusion V. 'When formulating a long-term policy, the paramount consideration should, in our view, be a plentiful supply of low-cost energy with a freedom of choice to the consumer. We recognise none the less, that such freedom of choice for the consumer of energy is only likely to be in the general interest if all possible steps are taken to ensure that competition between different sources of energy is fair and that distortions are either eliminated or adequately compensated.'

Conclusion VIII. 'Any policy for the development of indigenous energy resources should be based on the probable long-term trends and should be guided by sound economic considerations. Such a policy should not be allowed to lead to any considerable increase in the cost of energy, and would not necessarily do so.'

Conclusion XI. 'Prices to be charged for different forms of energy should fully reflect the costs and scarcities of individual types of energy. The price differentials between different types of energy should be such as to secure that each is used for the purposes in which it can be employed to the best advantage.'

Conclusion XVI. 'We believe that the future of coal very largely depends on an increased transformation into secondary forms of energy, easier to distribute and more convenient to use. We hope that research will continue to be conducted into these problems.'

Despite the present difficult phase in the evolution of the United Kingdom's nuclear power industry, it is popularly accepted that the nuclear age is in sight and that the era of cheap and unlimited power is almost at hand.

The engagement and acceptance of such a conception reacts to the detriment of the gas industry in the minds of present consumers and potential consumers and influences the policy of authorities responsible for housing design and the installation of fuel services.

The position that nuclear energy might occupy in the supply of total energy requirements over the next decade or two is uncertain. The proposed acceleration in the installation of nuclear power stations was brought about by the inadequacy of the coal output to meet demands and by the gap between the demand and potential supply which was forecast might arise in the middle 1960s. Plans to meet that gap had to be made based on oil or nuclear energy or a combination of both.

The first nuclear programme for the installation of 1,500 to 2,000 MW by 1965 envisaged saving between 5 mill. and 6 mill. tons of coal a year. This programme was amended in 1957 to one of 6,000 MW. by the same year to save 18 mill. tons of coal a year. This programme has since been rephased for completion in 1966.

Select Committee report

In its Fifth Report, the Select Committee on Estimates[3] shows less optimism in its reappraisal of the place nuclear energy may take within the near future. The revised programme is partly due to the advances made in conventional generating stations.

The estimated capital costs of nuclear power stations are put currently at £145 per kW installed, falling to £75 per kW by the early 1970's, subject to successful development of fast breeder reactors from the prototype at Dounreay.

This contrasts with £40 to £50 per kW installed at conventional power stations, which cost is tending still further downward.

The cost of production from the nuclear stations in the present programme is estimated at .70d. per unit compared with conventional power stations at .50 to .60d. per unit, depending upon location.

Thermal efficiency in conventional stations is rising with increase in unit size, and the effect has been, despite advances in the nuclear field, to put back the 'break even' date in production costs. Much depends on the price of coal, which, from a continuous upward trend, has stabilised, although this may only be a transitory feature.

Meantime, it seems possible to say that under the present programme of the Central Electricity Generating Board, nuclear generation would provide one-sixth of the electricity production in 1966. A valuable addition to the country's electricity supply system will have been made and the electricity industry will possess the advantage of a choice of three basic forms of energy, *viz.*, coal, oil and nuclear fuel.

The gas industry, too, is extending the range of the raw materials it employs.

Carbonisation of coal, gasification plant for oil or coal, reforming plants for refinery or imported gas, and, later, hydrogenation plants for oil or coal are likely to predominate in the 1960's, with advantages in the provision of non-toxic sulphur-free gases at lower costs.

The relative use made of each raw material will depend on its cost, but indigenous sources, including coke oven gas, if at competitive prices, should have first preference.

The dimensions of the future coal industry depend upon its ability to provide a source of energy that can be processed to acceptable refined forms at competitive costs.

The secondary fuel industries, gas and electricity, will, if

given freedom, turn naturally for their raw materials to the cheapest natural form of energy.

The consumer, given freedom of choice, turns to that form of energy that will meet his requirements effectively at the lowest cost.

These are truisms for which there is a wealth of evidence around: In this country, the swing to oil by industry; in America and on the Continent, the rapid progress of the natural gas industry.

Such trends can, therefore, only be influenced by a national fuel policy. A revised coal price structure could be designed to guide the consumer towards the fuel best suited to his purpose and most in the national interest.

Production of coal must be concentrated in modern pits and the total product sold at reasonable cost. Even the present monopoly market for coking coals will soon meet competition if all grades mined do not find reliable markets. Sound coal pricing policy must strike a balance between sized coals and smalls that ensures outlets for both. Pricing policy for the past 20 years has been to levy preferential increases on the sized and carbonisation coals in short supply, but this policy is defeating its own ends. By such processes as the Lurgi, the gas industry itself promises to be a large consumer of smalls and the electricity industry is continuing with a large programme of orthodox stations. Large coal is being displaced from the domestic market due to consumer reaction against the open fire and the implementation of the Clean Air Act. The railways' use of large coal is decreasing.

The only consumer of sized coals upon which the coal industry can depend is the carbonisation industry, but even it is unreliable unless coal marketing policy permits the sale of town gas and smokeless solid fuel at competitive prices.

Increased contribution by nuclear power to total energy requirements is inevitable; but production costs, limits of capital availability, and the solution of difficult technical problems all indicate that this is a road along which the electricity industry must hasten slowly. The immediate need is for a balanced commercial policy for coal that will ensure the well-being of both secondary refined fuel industries, and this requires reversal of the price trends of the past two decades.

There remains the question of the part to be played by oil and natural gas. If oil is permitted to enter the country freely and be marketed at present prices, the gas industry must be given equal access to natural gas and/or liquid petroleum gases.

It is doubtful wisdom to allow circumstances to develop that can only lead to more reliance by the gas industry, and by industry generally, on imported raw materials while the country's coal resources are neglected. The prosperity and standard of living must in the long term depend on natural resources and the skill of the inhabitants in putting these resources to good use.

Oil in troubled areas

Much of the world's oil lies in troubled political areas where the standard of living is low, but where local pressures are evident to secure a greater return from their natural resources. These countries will continue to demand and be conceded a growing return from their exports; and, as their skill increases, they will process the crude oil and market refined products. A run-down coal industry then will be of little value in bargaining.

Any neglect by the nation of the coal industry brings great danger to the nation's independence and long-term prosperity: neglect of the gas industry by the coal industry can only be to the detriment of the coal industry and the nation. World oil prices may rise long before nuclear power is making a major contribution to total energy requirements.

Coal marketing policy should ensure the best use being made of each ton; the smalls to the power stations and total-gasification plants; the large, sized and the coking coals to carbonisation plants. The nuclear programme should accord with technical advance, availability of capital and be subject to the overall economics of the process. Oil, imported liquefied petroleum gases and natural gas should be complementary to energy requirements derived efficiently from native resources.

The gas industry, in such a scheme of things, would consist of a number of relatively large producing stations in the coalfields, together with some at ports, based on the use of oil, all linked by a national grid. This is exemplified by the Lurgi project at Westfield, a project made possible by co-operation between the coal industry and the gas industry.

To achieve the transformation envisaged will call for men of ingenuity and resource, and it is our responsibility to consider well how we are equipping young engineers for the years of challenge. Such enterprises will make demands beyond mere competence in the traditional technology of the gas industry.

Ten years ago

Little more than ten years ago, the direction and management of the gas industry was largely in the hands of men who were proud to accept the appointment of Engineer and Manager to gas undertakings great and small. The majority of these men received a wide training in gas engineering in their early years and thereafter aspired, through the normal channels of promotion according to their qualities, to the ultimate goal of Engineer and Manager with full responsibility for all the activities in a gas undertaking. On their way, they had many opportunities for developing the skills of management and acquiring breadth of experience.

Today, however, some of the most senior appointments in the industry are being occupied by persons from other professions, and while a measure of broadening of background of the administration has been welcome, it is a development that focuses attention on the training of the gas engineer and how best to develop that extension of his technological talents such as will equip him for ultimate office in the gas industry.

The situation is not peculiar to the gas industry, as was brought out by Sir Ewart Smith in the Graham Clark Lecture to a joint meeting of the Institutions of Civil, of Mechanical and of Electrical Engineers in December 1957. In this lecture, Sir Ewart said that 40% of companies in the engineering industry proper had boards with no technically qualified member, and that, of all directors of engineering companies, less than 22% had technical qualifications, and of these only three-quarters were engineers.

Sir Ewart thought that the main reason lay in the acute shortage of engineers and other technologists, which tended to confine them to their own specialist work, and if a greater proportion had been encouraged to undertake general duties they would play a wider role in top management.

In the gas industry, one cannot accept shortage as the cause, but lack of opportunity for fuller development may be inherent in the functional organisation now being generally adopted by the area boards and from the considerable specialisation now occurring within gas engineering itself.

There are many definitions of management, but the following is as good as any:—

> 'Management is the organisation and control of human activity directed towards specific ends.'

Management deals primarily with human beings and getting things done through human beings, and it can, therefore, never be wholly scientific, but must be regarded partly as an art. While scientific techniques are applied to materials governed by known physical laws, the techniques of management are applied to people with less predictable reactions.

Education in scientific principles, and in the design, construction and operation of process plant and equipment falls short of the range of qualities required for successful management. The rigid disciplines of thought encouraged by education in the sciences is probably not an ideal training for the wider demands of senior managerial status. Technologists are exact men; they are accustomed to state problems and derive solutions in precise terms; they are disinclined to action until a logical conclusion is derived from closely defined facts. But, while there is need in the technologist for an exact man, the wider problems of direction and co-ordination of human activity call for a greater diversity of qualities.

The ever accelerating pace of addition to the storehouse of scientific knowledge presents great opportunities and grave problems in its development and has given birth to the specialist. But who is fitted to direct and co-ordinate the specialists who are at the limits of knowledge in their own fields? Men must be found for the task, but from what sources shall they come and how best can they be equipped?

The first step in effective management is definition of purpose. With the purpose defined, the manager must plan and organise for its achievement from analysis of all the relevant facts. A knowledge solely of processes and techniques domestic to the gas industry is not a sufficient background. The effective manager must be equally well informed of the strengths and weaknesses, and of the policies, of other fuel industries before he can plan and organise to best advantage. He must be aware of the significance of the activities for which he is responsible in the social and industrial community at large. He must be sensitive to the pulse of public opinion in relationships external to the industry; he must maintain harmony and firm, but fair, discipline in industrial and human relationships within the industry. Not least in importance, affairs must be conducted with due regard to a sound economy.

Over-early specialisation

It is said that leaders will out, but, although true of the outstanding and exceptional man, there are many more who have grown with the exercise of responsibility placed upon them. Opportunity as well as instruction must be given to the young men to develop their talents to the full. Over-early specialisation will bring unbalanced growth and frustrate the expansion of many who might have ranged over wider fields. Functional organisation is generally accepted as the only effective pattern of organisation of industrial and commercial activity on a large scale, but there must be interchange of staff between the functions at lower levels. Organisations were made for men, not men for organisations, and any organisation that does not provide opportunity for the use of a man's total talents is to that degree inefficient and contains the seeds of disharmony. In the ultimate, the spirit of an organisation matters more than the pattern.

There is now a tendency to crowd still further the curricula of technological courses to keep pace with technological advance, and each further step in this direction must make more difficult the broadening of the field of study that is so necessary to the making of the full man. Too early specialisation in formative years will create a real danger of breeding a race of specialists who more and more will only be able to communicate with specialists in their own field and be unable to adapt themselves to administrative matters, and though specialists have a great part to play in a team, absence of team control and direction can lead but to inefficiency in industrial organisation.

Positive steps must be taken to achieve a balance between technology and the humanities in the educational system. Technological advance is useless unless interpreted and applied to the world at large. This can only be achieved by a wider education than the narrow curricula of the professional institutions today and by resistance to further specialisation in the secondary and grammar schools.

I quote from the conclusion of Sir Ewart Smith's address:

'Our own civilisation can continue successfully only if it achieves a balanced combination of the humanities and technology based on both science and art. Our need is for managers who are humanists, but who at the same time are able to understand and to use the tools of knowledge which science and technology provide.'

If engineers are to continue to aspire to the highest appointments in the gas industry, the span of their education must be broadened and their opportunity for experience in all branches of their profession extended, with responsibility clearly laid upon them from their earliest years in the industry.

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Protection for hands in industry

THE 17 types of glove specified in a revised British Standard for industrial protective gloves (B.S. 1651: 1960) offer protection against the majority of industrial hazards to which the hands are vulnerable. The standard contains an extensive list of classified hazards.

Materials for the gloves fall into four groups: Leather, plastics, rubber and cotton. Experiments are being carried out with new material for gloves and glove linings made from man-made fabrics and mixtures of man-made fibre and cotton. Depending on the outcome of these experiments, an amendment to the standard may be issued later.

Of the seventeen types of glove specified in the 1950 edition, one has been discarded. It has been replaced by fabric-lined rubber gloves and gauntlets.

The 46-pp. publication specifies design particulars, size, and detailed dimensions. Also specified are requirements for materials, and for their testing. In one test, air at a pressure of 20 lb. per sq. in. is introduced into the glove; no air bubbles must be seen to escape when it is immersed in water.

The construction of the protective gloves is fully dealt with, illustrations being used to amplify the text where necessary, particularly as regards the different types of glove.

Buyers and suppliers will find particularly useful the standard's two-page feature on 'Information to be given when ordering protective gloves.' Manufacturers licensed to do so may apply B.S.I.'s well-known monogram, the Kitemark, to their products.

Copies may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1, price 10s. (Postage will be charged extra to non-subscribers).

MORE THAN 10,000 VISITORS AT FIRST BRITISH SHOW

Pipes and pipelines

—an international exhibition

MODERN civilisation would clearly be impossible without the many thousands of miles of pipeline of all types and sizes which transmit the gases and liquids required for industrial and domestic use throughout the world. It has been estimated that in 1960 alone, some 27,400 miles of gas and oil pipeline will be laid in the different countries of the world, excluding the Communist bloc.

High-pressure gasification

Although the United States is the original home of the pipeline, the Old World is now forging ahead in this respect and in the United Kingdom the gas industry is an important user of pipes. The Lurgi high-pressure gasification plant now under construction for the Scottish Gas Board at Westfield provides a good example. The pipework for the grid system associated with this installation will, with its ancillary equipment, cost some £2 million.

Something of the contribution which British firms and equipment are making towards this industry was seen at the First International Pipes and Pipelines Exhibition at Earls Court, London, from May 30-June 2, when more than 10,000 visitors, including many from such countries as Sweden, Germany and the Soviet Union, were able to examine the latest developments over a wide field which included pipes, pipework and pipe fittings, insulation and protection materials, valves, gauges and testing equipment and pipelaying and welding equipment.

Improved welding

Among the more clearly marked trends at Earls Court, so far as the gas industry is concerned, were the development of improved welding equipment and techniques, the appearance of a number of new devices facilitating the installation of pipelines and the experimental introduction of new materials for gas pipes.

All the leading British manufacturers of welding equipment had taken stand space and all reported that the gas industry continues to be an important customer. An impressive exhibit on the **Lincoln Electric Co. Ltd.** stand was the latest addition to their range of engine-driven welding generator units. Known as the SA 200, this unit is powered by a Ruston Hornsby two-cylinder diesel and incorporates a newly designed generator unit providing 30-275 amperes hand welding current or 200 amperes continuously.

An important feature of the new unit is that the generator is mounted directly on to the engine bell housing and is driven through a coupling which connects to the flywheel by means of silent bloc flexible bushes. This is a portable unit, being available either with four small-diameter wheel running gear or with two large-diameter wheel running gear for fast road towing. The latter version is fitted with screw jacks and jockey wheel.

This S.A. 200 mobile welder, manufactured and supplied by the Lincoln Electric Co. Ltd., is widely used in the gas industry. It is fitted with standard four-wheel running gear and has a welding current range of 30-275 amp.

Welding electrodes of various types were shown by these companies, including the economical Celtian elec-

Celtian electrodes were used in the fabrication of a 26-mile stretch of gas pipeline near Newbury. These electrodes are produced by Quasi-Arc Ltd., and the site work was carried out by Constructors John Brown Ltd.

trode, specially designed by **Quasi-Arc Ltd.** for welding pipes and storage tanks. A display on the stand showed a 12-in. pipe being welded with Celtian electrodes, using the vertical downwards or stovepipe technique. These electrodes were used by Constructors John Brown Ltd. when fabricating a 26-mile stretch of gas pipeline near Newbury.

Murex Welding Process Ltd. showed a comprehensive range of their metal-arc welding equipment, accessories and electrodes, including the new Muramatic arc welding machine which has been designed to operate either with the submerged-arc or open-arc processes. This versatile piece of welding equipment has many applications in industry, including some of the heavier-duty work in the fabrication of gasworks plant.

Pipe cutting equipment was featured on the **British Oxygen Gases Ltd.** stand where the Alyn Mark 2 cutter was demonstrated in both manually-operated and motorised versions. Both machines are fitted with Siffire nozzles and, in addition to profiling work on 90° branches, tube ends may be cut and prepared for welding. Since the profiles of the cuts are self-generated, no templates or marking off are necessary, adjustment to the required profile being a simple matter. Each of these two machines has a capacity of 4 in. to 12¾ in. outside diameter and high cutting speeds enable a 12-in. diameter pipe to be completed in 2½ minutes.

In the gas industry, chief interest centres on the conventional iron and steel piping. **Foster Brothers Ltd.**, for instance, have been engaged in the manufacture of this material since the firm was established in 1888, and their stand at Earls Court displayed examples of their steel tubes to B.S. 1387, fabricated pipework and malleable iron fittings, all of which is well-known in the gas industry.

Plastic pipework

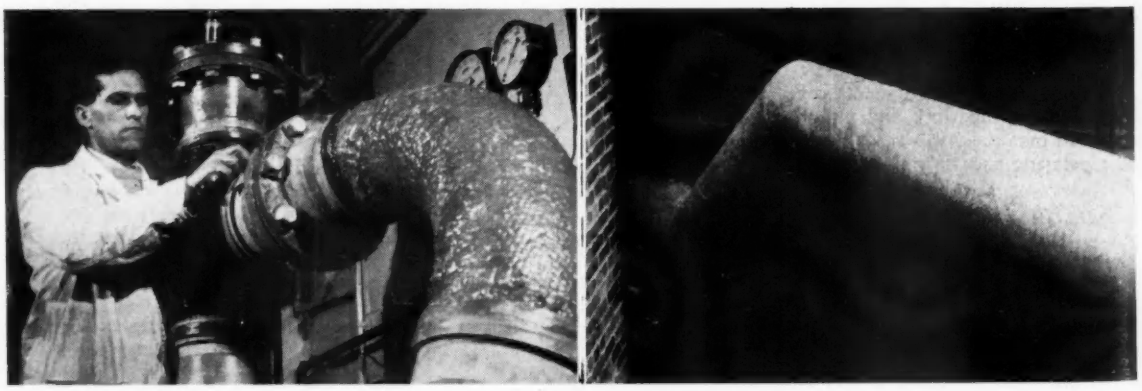
Foster Brothers have also entered the field of plastics pipework with their Deltathene high tensile polythene pipe which though not specifically designed for the gas industry may nevertheless find applications there. It is reported that at least one area gas board is currently experimenting with plastic piping on a considerable scale, using the products of a number of firms for this purpose.

Yorkshire Imperial Metals Ltd. have developed a plastics-covered copper tubing for use in connection with gas service in aggressive soil conditions. Known as Kuterlex, this can be supplied with a covering of either polythene or polyvinylchloride. This company has also introduced its new Polyorc B, a completely unplasticised p.v.c. piping, for underground mains and services. Though primarily designed for water services, Polyorc B is suitable for the conveyance of gas which is free from aromatic hydrocarbons. The company explains that extended service trials will enable the value of this material to the gas industry to be assessed more fully.

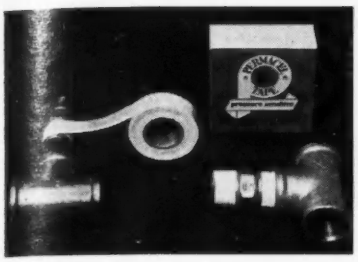
Anti-corrosive materials

In recent years the gas industry has been anxious to test the value of the various anti-corrosive materials and coverings for the protection of underground piping, and a number of firms showed products in this field. A particularly interesting example was seen on the **Stamford Engineering Co. Ltd.** stand in the form of the new Stamford coalescent fibreglass-coated and wrapped steel tube. This makes use of material from Fibreglass Ltd., which is wrapped round the tube in a coal tar coating, as opposed to the more conventional bitumen.

Although this material has been used for some time in the United States, it is a comparative novelty in this country and Stamford Engineering Co. Ltd. are confident that there is a big future for this product, particularly in view of the fact that whereas the raw material for the coal tar is found in abundance in the United Kingdom, bitumen is based on



Left: *Developed by Bristol Aeroplane Plastics Ltd., Bristol Pipe was one of several new materials on show at Earls Court. Although not specifically designed for the gas industry, these pipes could have applications in the future.*
Right: *Helical Weld steel pipe by the British Steel Piling Co. Ltd. is shown here carrying town gas at the Parkhead steel works of William Beardmore & Co. Ltd. Changes of direction in the pipe were made by using mitred bends.*



Left: *Permacel Tapes Ltd. are now marketing a new type of pipe thread sealant known as Ribbon pipe sealant.*

Right: *A portable, self-contained Ekco gamma Backscatter gauge which will detect small flaws or points of corrosion in the inner or outer surfaces of pipe walls.*

an imported product. The method adopted for applying the covering is to permit melted coal tar to drip on to the spinning tube while the fibreglass is simultaneously wrapped round it.

Reinforced pipewrap by Fibreglass Ltd. is widely used for the protection of buried gas pipelines, a recent example being the Scunthorpe to Lincoln line, laid by Constructors John Brown Ltd. in the course of which Fibreglass pipewrap was applied to 39 miles of 12-in. and eight miles of 8-in. pipe.

Light to handle

Glass fibre from Fibreglass Ltd. is also used by the Bristol Aeroplane Co. Ltd. in the manufacture of their Bristol pipe, a high-pressure pipe for oil or gas service of the epoxy resin type, reinforced with glass fibre. It is claimed that this pipe will cope with working pressures up to 900 p.s.i. while, because of their lightness, it is stated that three men can lay 200 ft. of 6-in. diameter pipe in an hour.

Glass fibre is also used as an outer wrap in the protection of gas pipelines which have been coated with the well-known bitumastic coatings manufactured and applied by **Wailes Dove Bitumastic Ltd**. An interesting feature on this stand was a film depicting the up-to-date mechanised methods employed at the firm's Hebburn works for the rapid and effective protection of pipes of various diameters for use in the gas and other industries.

Protection of pipes by wrapping with anti-corrosive pressure-sensitive tape is frequently used for irregular joints and other sections which cannot readily be protected by other means, but on the stand of **John Gosheron & Co. Ltd.** visitors could see an example of the continuous wrapping of considerable lengths of gas pipeline, including both 6-in. and 24-in. mains for the North Thames Gas Board. The material used was one of Gosheron's heavy-duty p.v.c. adhesive tapes which was applied by the company's Viper pipe-wrapping machine.

Ready identification

A new product on the Gosheron stand was the Transoprint pipe tape, a self-adhesive tape bearing various legends for the identification of pipelines in gas works and other installations. The tape is simply wrapped round the pipe concerned to give ready identification by personnel.

An interesting item of interest to gas engineers was noted on the stand of **G. E. Simm (Engineering) Ltd.,** which featured their Band-it system of stainless steel clamping. The company reports that one area gas board has used these Band-it clamps to hold lead sheet firm against the outside of a length of slightly porous piping, thus rendering the pipe fit for continued service in gas distribution.

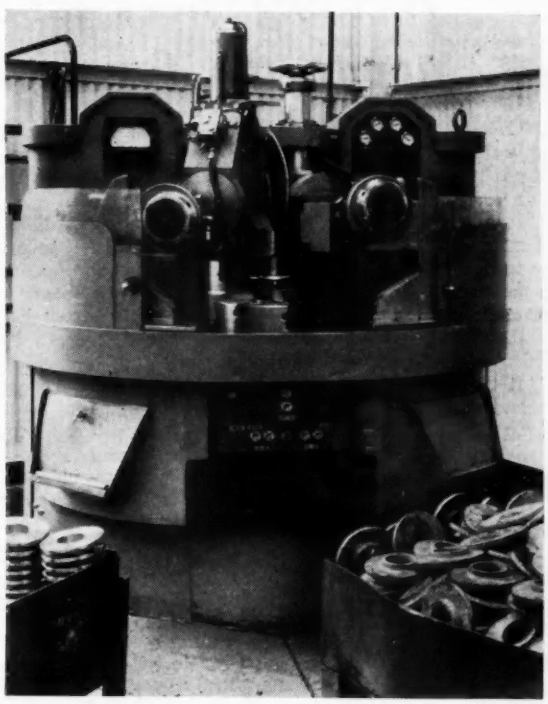
Equipment associated with pipelaying was shown by a number of companies, including **John Allen & Sons (Oxford) Ltd.,** who showed the Allen model 140 trencher, now made under American licence. This impressive piece of equipment will cut to a maximum depth of 5 ft. 6 in. and discharges the spoil well clear of the trench by means of a conveyor belt sited above the buckets. Trench width can be varied from 17 in. to 30 in. maximum.

Two new machines were shown by **E. Pass & Co. Ltd.** These included the hydraulic service pipe extractor for removing old or defective service pipes from below ground with the minimum of excavation and little consequent reinstatement costs. When replacing pipes beneath a road, for instance, it is only necessary to excavate a small hole at each side of the road and the pipe can be pulled through by the operation of a lever on the Pass service pipe extractor. The replacement pipe can be connected to the end of the old pipe and drawn through in its wake.

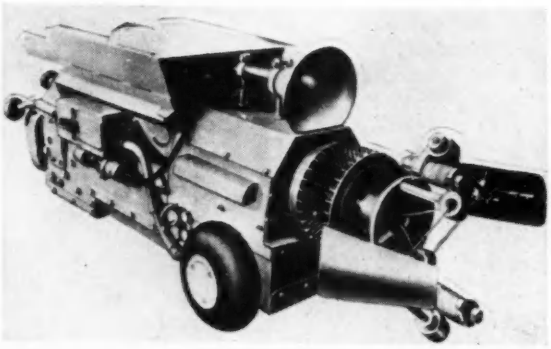
Hydraulic thrust borer

An addition to this company's range of thrust boring machines was also shown. This is the Junior hydraulic thrust borer, capable of exerting a thrust load of eight tons and able to operate below roads of up to 30-ft. width.

Pipe bending equipment was shown by **Chamberlain Industries Ltd.,** including the very new Staffa portable field pipe bender. This is readily portable and brings



A vertical lathe by Laird & Son Ltd. for machining pipe flanges in mass production quantities.



Mowlem-Centriline Ltd. specialise in the interior lining of pipes for protection and re-conditioning. Equipment is available for lining pipes from 4 to 144 in. diameter. Shown here is the Centriline machine for 24 in. diameter pipe.

the virtues of a heavy-duty hydraulic pipe bender to the most difficult field conditions. It is neatly designed for ease of operation and transportation and is supplied with a range of formers for bending pipe from 2-in. to 8-in. bore. Complete 90° bends can be produced in all sizes. Pipes up to 4 in. are bent up to 90° in one operation and pipes above these sizes are bent by successive bending.

Hilmor Ltd. also showed their well-known range of bending equipment, including hand-operated light-weight bending machines, portable hydraulic benders and two power-operated machines. One of the latter was the company's general purpose compression bender type HM2 which was shown in action bending 2⅜-in. outside diameter pipe for the gas industry.

A great deal of ancillary equipment is used in the gas pipeline laying industry, and a number of firms showed examples of valves, testing equipment and the like. The need to control higher pressures in the gas industry in the future is recognised and the Cort 100 valve, manufactured by **Robert Cort & Son Ltd.,** is of interest in this connection. This is a cast iron valve of American design which has been extensively used on natural gas lines in the United States. **The Triangle Valve Co. Ltd.** showed examples from their range including the new Triangle through-conduit pipeline valve available for manual or motor operation.

Valves and valve controls were also shown by **Hydraulics & Pneumatics Ltd.,** whose exhibits included fullway valves, hydraulic and pneumatic remote control for valves, and other ancillary equipment.

There was a general feeling among exhibitors that this first exhibition dealing with pipes and pipelines had been a distinct success and, as Sir Harold Hartley said in his opening address, the exhibition showed '. . . the widespread contribution that British engineers are making to pipeline techniques and to their construction all over the world.' It is therefore interesting to note that the organisers have decided to hold another exhibition next year, instead of waiting until 1962 as orginally planned. Scientific Surveys Ltd., which organised the exhibition, and the journal *Pipes and Pipelines* which sponsored it are to be congratulated on the success of their venture.

GAS ON THE CONTINENT

Welding steel tubes for Saharan gas, apparatus for high-pressure sampling

THREE companies are studying the possibilities of welding large steel tubes for submarine transmission of gas from the Sahara, reports *Journal des Industries du Gaz.*

'It is a question, not only of verifying the possibility of making tubes of this length (2.5 km.; roughly 1½ miles) by successive connections but of assuring their protection in the water. The 2.5-km. tube having been assembled by the end of March or early April, the first tests of immersion in the Mediterranean will be carried out at a depth of 500 m. (roughly 1,640 ft.).

'If they are successful these tests will be followed by a second series—the immersion of a tube 5 km. long at a depth of 2,700 m. (8,870 ft.). If these trials proceed normally we shall know the results towards the end of June. Not till then can a decision be reached which would persuade Gaz de France to undertake gas utilisation tests or put an end to this attempt.'

Among other possible solutions to this problem, **Petrole Informations** mentions that of the construction of a submarine tunnel near Gibraltar.

Meanwhile, according to *Hambourg-Information,* a Hamburg firm intends to build several large tankers, at an estimated cost of 16.7 mill. dollars each, for the transport of liquid gas was from the Sahara to Germany. The project envisages ships of 65,000 tonnes, with insulated tanks for 28,500 tonnes or 40 mill. cu.m. of methane. In other words, three ships could transport 1,500 mill. of cu.m. (say, 53,000 mill. cu.ft.) of gas per annum to Germany.

M. A. Gouffe (Consulting Engineer) and M. H. Gaudry of the Research Department, Landy, describe an apparatus for sampling gases at high pressure. The problem is to obtain a sample corresponding exactly in chemical composition of a gas passing through a volumetric meter working at a pressure of several atmospheres.

The principle

The principle is described thus: If one fills, once every N revolutions of the meter, a capacity of fixed volume v with gas at the absolute pressure P, and if one then discharges this capacity into a gasholder at a pressure equal to one atmosphere, the transfer corresponds to a volume (P—I)v and not Pv because of the residue of gas remaining in the capacity at the absolute pressure of one atmosphere. To obtain the desired proportional factors constituting Pv, it suffices to fill, a *second time,* the capacity at a pressure of two atmospheres absolute and to pass this immediately to the gasholder. The total volume transferred is thus:

$$(P - 1)\,v + (2 - 1)\,v = Pv.$$

The description is illustrated by a schematic drawing and a photograph. Only three sets have so far been made and these have yet to be proved in long service. Experience alone will decide the value of this attempt to solve the interesting problem of sampling gases under pressure.

A FULL REPORT

of the meeting together with abstracts of the papers, the discussions, and comprehensive photographic coverage, will be in a special isssue next week dealing with the 97th INSTITUTION A.G.M.

NEWS SUPPLEMENT

PILOT PLANT TO TEST COMPLETE LOW-GRADE COAL GASIFICATION

THE economics of a new complete gasification process for obtaining gas from low-grade coal are to be investigated at a pilot plant which is to be built at the North Thames Gas Board's works at Bromley, East London. The pilot plant will be operated as an experimental unit by the London Research Station of the Gas Council and its capital cost will be approximately £225,000. It is expected to produce about 2 mill. cu.ft of blue water gas per day.

The contract for its construction has been placed with Simon-Carves Ltd., who are working in conjunction with Dr. C. Otto & Company of Bochum, West Germany. Work has already started, and will be completed in about a year.

The decision to build this plant has arisen from the need for a process which will gasify the cheapest grades of coal completely, producing blue water gas on a large scale at the lowest possible cost.

The intention is that this cheap blue water gas would be mixed with a cheap rich gas—such as imported methane, gas obtained from oil gasification, or tail gases from refineries—to provide town gas at the statutory calorific value.

MORE EXPENSIVE

This has become necessary because it is now more expensive to manufacture 'lean', or low-calorific, gas in existing conventional plants than it is to produce rich, or high-calorific, gas.

It is essential, however, to have supplies of lean gas in order to reduce the calorific value of rich gases to a standard level.

Interest in complete gasification of coal has also arisen because of the shortage of the conventional coking coals which the gas industry has always used in the past; as a result, there is the prospect of a coming shortage of the good quality coke which is used to manufacture blue water gas in conventional plant.

Because of this prospect, work was started in the Gas Council's London Research Station ten years ago to find new methods of producing blue water gas.

A comprehensive survey of all

Continued on p. 389.

IN PARLIAMENT LAST WEEK

More information for Commons on state industries' plans

MR. HEATHCOAT AMORY, Chancellor of the Exchequer, announced in the House of Commons last week that the Government intends to make proposals in the autumn for supplying information, which the House could debate, about the annual investment of each of the nationalised industries.

Mr. Amory said that Parliament was interested in and entitled to be interested in the investment programmes and in the individual and the total sums to be spent by the nationalised industries. These investment programmes were likely to be available in the autumn and the estimates of what would be needed to meet the programmes by February.

It was the Government's expectation that by the autumn they would be able to make new proposals for the handling of these matters, including the supplying to the House of information which they could examine and debate, both on the annual investment programme of each industry and on the estimated amounts that each industry would require to borrow from the Exchequer for the coming year.

Prior examination

The essential thing, if the Government were to meet the wishes of members, was that this information should be available to the House for examination before the programme was put into operation.

Mr. Harold Wilson (Lab. Huyton) said that the Opposition would watch for this matter with some degree of suspicion. It was to be hoped that the Chancellor would include in his consideration the equal, if not the greater need for the House to be supplied with similar information about private industry.

The subject was introduced during the committee stage of the Finance Bill, when Mr. Gerald Nabarro (Con. Kidderminster) moved an amendment to reduce from £2,050 mill to £2,007 mill. the aggregate of sums for the capital investment of programmes for the year ending August 31, 1961, of seven nationalised industries. He said that this was the master amendment to seven others which sought to reduce the advances due to be made to the Electricity Council, the North of Scotland Hydro-Electric Board, the South of Scotland Electricity Board, the Gas Council, the B.T.C., B.O.A.C. and B.E.A.

Accountability

It was impossible to investigate the sum being spent by any nationalised industry, and his purpose was to bring within the ambit of the Finance Bill individual accountability for each industry each year before the money was spent.

In the Bill there was a new increase in Government expenditure. No member knew how the money was to be spent. There were no programmes published for any of the nationalised industries. How could the Chancellor with any truthfulness say that Parliament was properly scrutinising the sums being voted for these industries?

His ultimate objective was a separate Capital Investment (Nationalised Industries) Bill, with one clause for each industry specifying how the money was to be spent.

The amendment was by leave withdrawn.

DAVY-UNITED—POWER-GAS REACH MERGER TERMS

TWO big engineering groups—Davy-United, of Sheffield, and the Power-Gas Corporation, of Stockton-on-Tees—are planning to merge under a £14-mill. shares exchange. The two companies have combined assets exceeding £17 mill.

It was announced last November that the two companies were discussing a possible merger, and now the Boards state that agreement has been reached on the terms to be recommended.

They express their confidence that the proposed merger has a sound economic and commercial basis and will result in increasing benefits to the members of both companies.

Davy-United specialises in hydraulic presses, steel works plant, welded structures, and are the biggest builders of rolling mills in Britain.

Power-Gas specialises in the design, manufacture and construction of gas, chemical and iron and steel works plant and equipment, and have a subsidiary called Nuclear Chemical Plant, concerned with the design and engineering of process and treatment plant for nuclear industry.

Davy-United will offer 17 new £1 ordinary shares for every 20 10s. ordinary shares of Power-Gas. On present market prices the offer is worth about £14 mill. If the deal goes through Davy-United will change their name to Davy-Ashmore, Ltd., thus continuing the name associated with a principal operating subsidiary of the Power-Gas Group—Ashmore, Benson, Pease and Co., Ltd.

If the share offer is accepted in full the issued share capital of Davy-Ashmore will be £5,399,056.

Ministry chief retires

Mr. J. W. Davies, O.B.E., senior officer for Wales, Ministry of Power, has retired. Our picture shows Mr. Davies being greeted by Mr. T. Mervyn Jones, Chairman of the Wales Gas Board, on the occasion of his farewell to the Members of the Board. Shown in the photograph, from left are: Mr. C. B. Mawer, Dr. H. T. Edwards, Col. C. G. Traherne, Mr. R. S. Snelling, Mr. E. M. Edwards, Mr. J. W. Davies, Mr. T. Mervyn Jones, Sir William Jones, Councillor J. Emanuel, Mr. J. C. Clay and Mr. Frank E. Price.

'ODD ITEMS' DEBTS CRITICISED BY SHERIFF COURT

THE Scottish Gas Board's policy of suing consumers for 'trifling sums' in small-debt actions was criticised by Sheriff Sinclair Shaw at Kirkcaldy Sheriff Court.

Faced with 25 actions—13 of them for sums of less than £1 and eight for less than 10s.—Sheriff Sinclair Shaw asked if the accounts were rendered separately from gas accounts.

When a solicitor for the Scottish Gas Board said that almost all of them were for repairs, fittings and odd items which were impossible to recover by any other method, the Sheriff asked: 'Would it not save a great deal of time if the Gas Board put these charges for these trifling services on to the gas accounts? It seems to me that in a great many of these cases people just cannot be bothered to go in to pay 4s. 3d., 2s 6d. and so on.'

Stock-piling throws burden on industry

COAL IN THE RED FOR £52 MILL.

THE National Coal Board last year incurred a net deficit of £24 mill. against £3.5 mill. in 1958, bringing the accumulated deficit to £52 mill. The Board's annual report and accounts for 1959, published last week, showed that the stocking of coal and coke is estimated to have cost some £27 mill.

Between the end of 1956 and the end of 1959 the total consumption of British coal fell by 33 mill. tons, and during 1959 the Board's policy, begun in 1958, of gradually reducing deep-mined and opencast production was continued.

Productive capacity had been maintained over the past three years, and in the Board's opinion the industry would be capable of meeting the demand assumed in 'Revised Plan For Coal' of 200 to 215 mill. tons by 1965, mostly from new and reconstructed collieries. The cut in opencast production from 14.3 mill. tons in 1958 to 10.8 mill. in 1959 resulted in a severe loss of profit but lessened the effect on the deep mines of the fall in demand.

At the end of 1959 undistributed stocks amounted to 36 mill. tons.

During 1959 productivity had reached a record level at an average for all workers of 1.332 tons a shift—5.3% higher than in 1958, and in spite of extra costs it was found possible to bring about a reduction of 1s. 6d. a ton in average costs over the year. Part of this benefit was lost, the report states, by reason of a fall in average proceeds to 83s. 5d. a ton compared with 85s. 1d. in 1958.

The operating profit for the year amounted to £13.1 mill. After deducting £36.8 mill. for interest payable to the Minister of Power, and £300,000 for other interest, a deficit was arrived at of £24 mill.

In 1959 as a whole, coal consumption was 12.5 mill. tons less than in 1958, but of this reduction, the report points out, 9 mill. tons came in the first half of the year.

The Board are collaborating closely with appliance manufacturers in the development of more efficient coal burning appliances. Keen competition was experienced in all export markets and exports and bunker shipments amounted to 4.3 mill. tons, about 500,000 tons less than in 1958.

The total output of saleable coal—206.1 mill. tons, including 10.8 mill. tons from opencast working—was 9.7 mill. tons less than in 1958 and was the lowest of any year since 1947.

Towards the end of 1958 the N.C.B. decided that after completing further trials of the underground gasification technique then being planned, further expenditure would not be justified. A report of the work is to be published this year. In the meantime, it is noted that 'a preliminary assessment of the results, and of the data obtained from the exchange of visits with Russian experts in 1957 and 1958, indicates that underground gasification is not a commercial proposition in this country.'

For 1960 the Board say that their plans should be seen in the context of the next six years as a whole. Production will be reduced so that if demand reaches the estimated figure there will be no net addition to undistributed stocks over the year. It was also expected that output per manshift would increase still further.

PERSONAL NOTES

Radiation retirements

MR. F. A. HOOPER, M.C., and MR. KENNETH N. DAVIS have retired from the Board of Radiation Ltd.

Mr. Hooper joined John Wright & Co. Ltd. as assistant sales manager in 1923. He became a director of John Wright & Co. Ltd. in 1938 and joint managing director in 1946. He was appointed to the parent Board of Radiation Ltd. in 1944, where he was largely concerned with the unification of the more individual selling organisations of the six Radiation companies which resulted in the formation of Radiation Group Sales Ltd. in 1949, of which company he later became managing director. He retired from this position in 1958, but until now has remained a member of the Board of the parent company. He was chairman of the S.B.G.I. in 1950-51 and with Mr. S. G. Aberdein was the first joint chairman of the joint consultative committee of the S.B.G.I. and the Gas Council which was set up after the nationalisation of the gas industry. Mr. Hooper is retained by the Radiation Group in a consultative capacity.

Mr. F. A. Hooper

Mr. Davis, the son of Mr. Harold Davis, a founder Director of Radiation, was educated at Marlborough and Trinity College, Cambridge, where he graduated in engineering. He then joined the family business of the Davis Gas Stove Co. Ltd., Luton. He became a Director of Radiation Ltd. in 1939, and became chairman of the Davis Gas Stove Co. Ltd. in 1948. After the war he took charge once again of the Luton company until 1954, when he became a whole time executive director of Radiation Ltd. with special responsibility for recruitment, selection and training. He has always made it clear that he never intended to continue as a member of the Board until the normal retirement age—he is now in his 50's—and retired from his executive position in 1958, since when he has been a member of the Radiation Board until the present time. He has been a member of the executive of the Industrial Welfare Society for 25 years and was its chairman for three years. He is just completing three years as Chairman of the Training and Education Committee of the Council of Foundry Industries.

Mr. K. N. Davis

MR. H. R. HILL, technical director of Bratt Colbran Ltd., has retired. Mr. Hill joined Bratt Colbran in 1933 as manager of the gas department formed for the manufacture and sale of Portcullis gas fires under licence from the Gas Light & Coke Company. Since the war Mr. Hill has been closely associated with the development of the neat flame burner for space heating appliances, as well as the application of the principles of convection to gas fires. In 1955 he was appointed technical director. At an informal ceremony at Lancelot works, Wembley, the Chairman of Radiation Ltd., Mr. W. Donald King, made a presentation to Mr. Hill from the Board and his colleagues in the Group. Mr. King paid tribute to the services Mr. Hill had rendered to the Group and to the gas industry generally.

Mr. H. R. Hill

MR. H. G. WILLIAMSON, a director of Evered & Co. Ltd., who has spent all his working life with the company, has retired. He was guest of honour at a dinner to mark the completion of 65 years' service. He represented Evered in the south, east and south-east of England and became a very well-known figure in the gas industry.

MR. S. H. BAILEY, publicity manager for George Ellison Ltd., since 1934, has retired. He is succeeded by MR. DAVID I. HERBERT.

COMING EVENTS

June 9.—SOUTH WESTERN G.C.C.: Town Hall, Torquay. 11 a.m.
June 11.—EAST OF SCOTLAND JUNIORS: Golf outing.
June 16.—MIDLAND JUNIORS: Stoke-on-Trent. Ladies Day. 9.45 a.m.
June 17.—NORTHERN JUNIORS: Annual General Meeting
June 18.—WESTERN JUNIORS: Bristol. Summer Meeting and Ladies Day. 10.30 a.m.
June 18.—MANCHESTER JUNIORS: Southport. Ladies Day.

Mr. D. E. Rooke, whose appointment, as chief of the new Development and Planning Section of the Gas Council, was announced in the 'GAS JOURNAL' last week.

PILOT PLANT

—from p. 387

known methods, and methods which were only in the early development stage, was carried out. The result of this survey was that attention was focused on a process known as the slag bath generator which has been developed in Germany from an invention by Herr Roman Rummel of the Union Kraftstoff A.G.

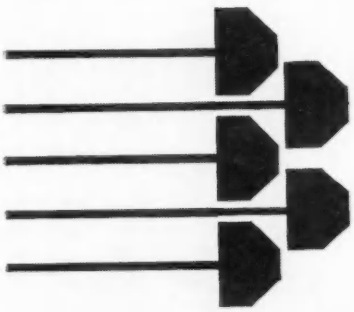
This process involves forcing powdered coal, together with air or oxygen and steam, into a bed of molten slag, which produces blue water gas continuously. This process in a somewhat different form has been operated on a large scale in Germany, using brown coal as a fuel.

In this country, where there are no considerable quantities of brown coal, modifications have been made, and the pilot plant will utilise powdered low-rank black coal as a fuel, and use air instead of oxygen in the processing.

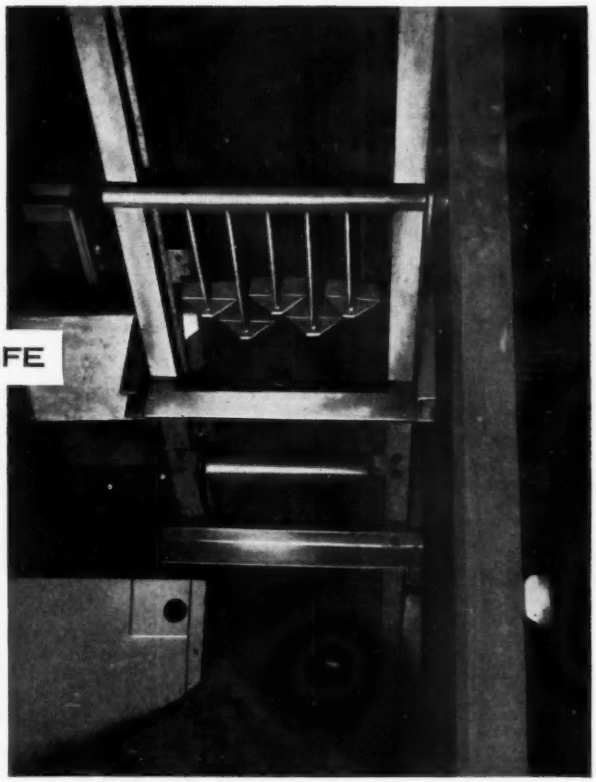
Because of this use of air instead of oxygen, the slag bath generator which it is proposed using in the pilot plant at Bromley will consist of a twin-shaft system and a divided slag bath in one part of which coal is burned in air with combustion products escaping up one of the shafts.

In the other part coal will react with steam in the presence of molten slag, heated by the combustion in the first half of the bath, to produce blue water gas.

The molten slag will be kept circulating under a dividing curtain so that heat generated on the combustion side is carried into the gas-making side to provide the heat required in the process.

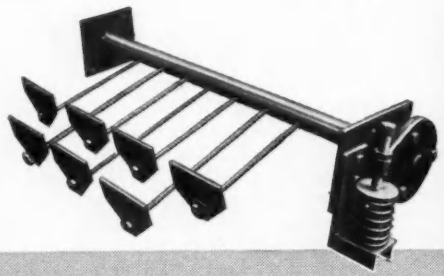


FOR LONGER BELT LIFE



This steel foundry conveyor is handling abrasive Chelford sand with 5% clay content. The Sutcliffe Multi-blade Conveyor Belt Scraper, shown fitted, removed in one week (114 hours) the substantial amount of sand shown in the lower photograph. Try a Sutcliffe Multi-blade Scraper on your installation—whatever the make of conveyor it can readily be fitted. Send now for our leaflet ref: G J 104.

Britain's best belt cleaner proves its worth



Sutcliffe

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